DAQ in tunnel: Recent problems

- Fri. Jan. 14: starts giving crate 5 errors in log files, runs ending early
  - further look: memory test failing (new debug tool to us)
  - over weekend quick look in tunnel does not help
  - maint. day Jan. 19: P.S. replaced, no help
    crate con. replaced, all OK; crate con. debugging shows problems

- Sun. Jan. 23: shows problem similar to BZ problem just fixed for
  for upstream DAQ: WFDs all pulser different times
  - problem still there morning Mon. Jan. 24; gone by afternoon, since

- Wed. Jan. 26: crate 6 shows errors like crate 5 did 12 days earlier:
  log file errors, mem. test errors
  - crate power off/on ~2 hours; all OK after
  - Fri. Jan. 28: same problem; same crater power cycling 'fix'
  - Sun. Jan 30: after weekend OK running, run fails with new error:
    "FATAL: USB timeout or CAMAC switched off."
    cycled power, mem. test failed., cr 6 out of readout, OK overnight
  - Mon. Jan. 31: test run w/ cr 6 in gives no errors

DAQ in tunnel: do we need it there?

Two major changes to reduce pileup (shorten signals):

- Q→I sensitive preamps, faster pulses
- DAQ counting house→tunnel, shorter cable/pulse

So: How are we doing so far?

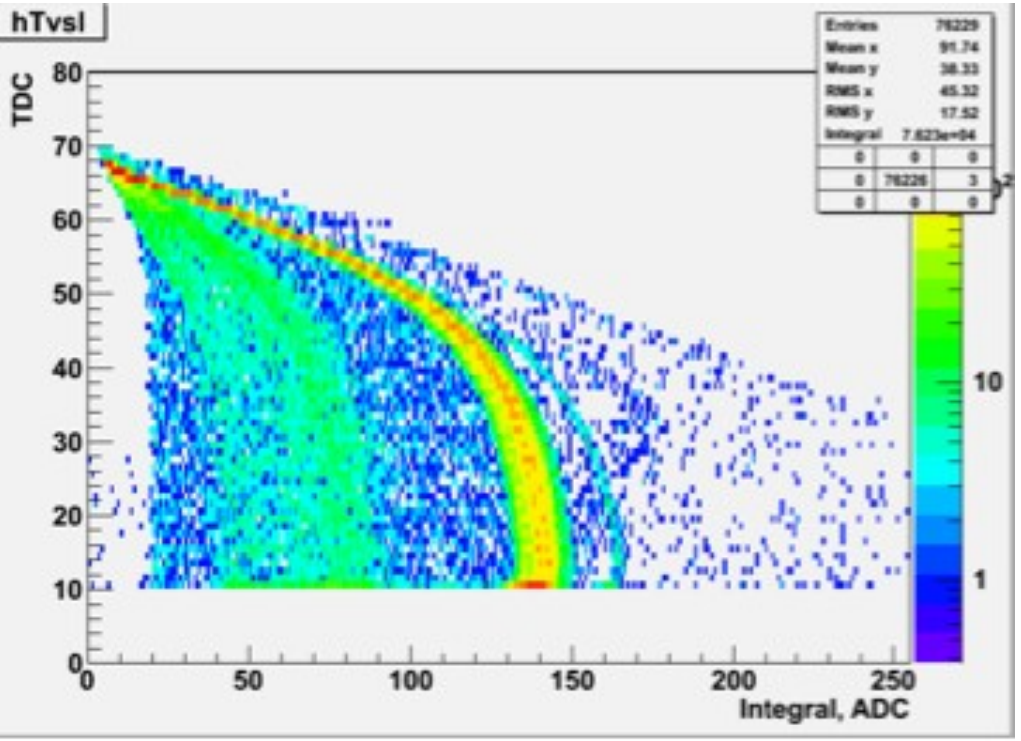
- Look at α runs, uniform in time/TDC
- Look at WFD integral:
  falloff of I at large T indicative of pulse width

Compare:

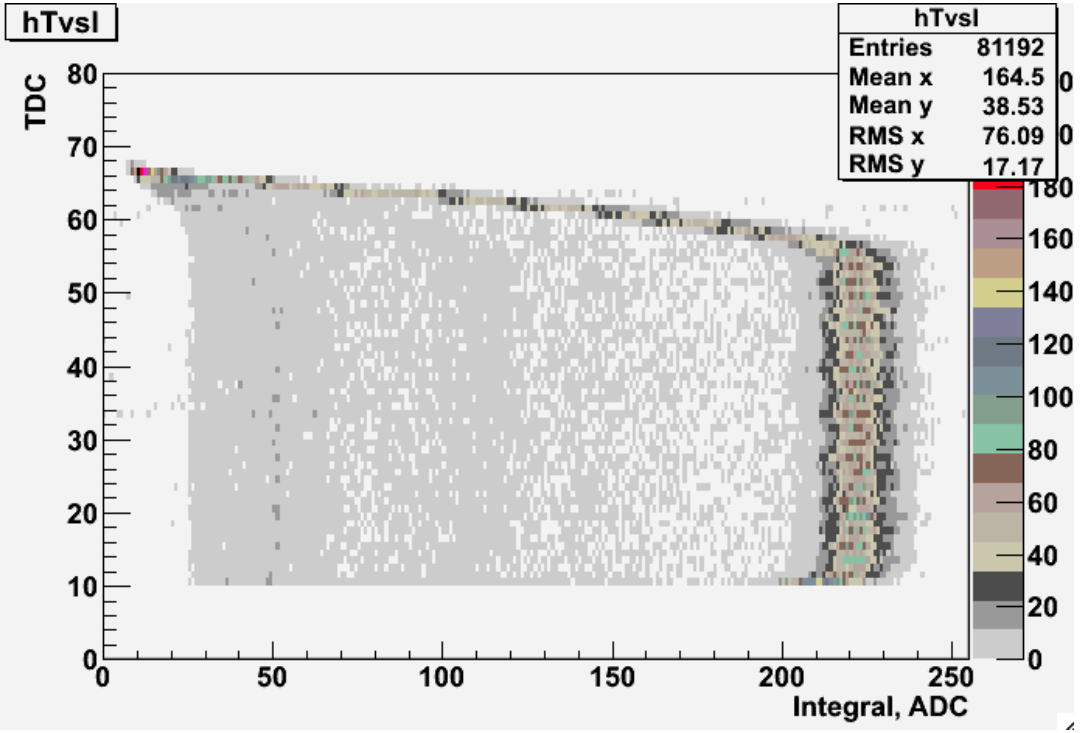
- Run 9↔Run 11 DAQ in counting house ⇒ effect of preamps
- Run 11 DAQ in counting house↔DAQ in tunnel ⇒
  effect of shorter cables

Run9/Run 11 DAQ in ctg. house

Run9 (from D. Smirnov)



Run11 blu1 all chan.



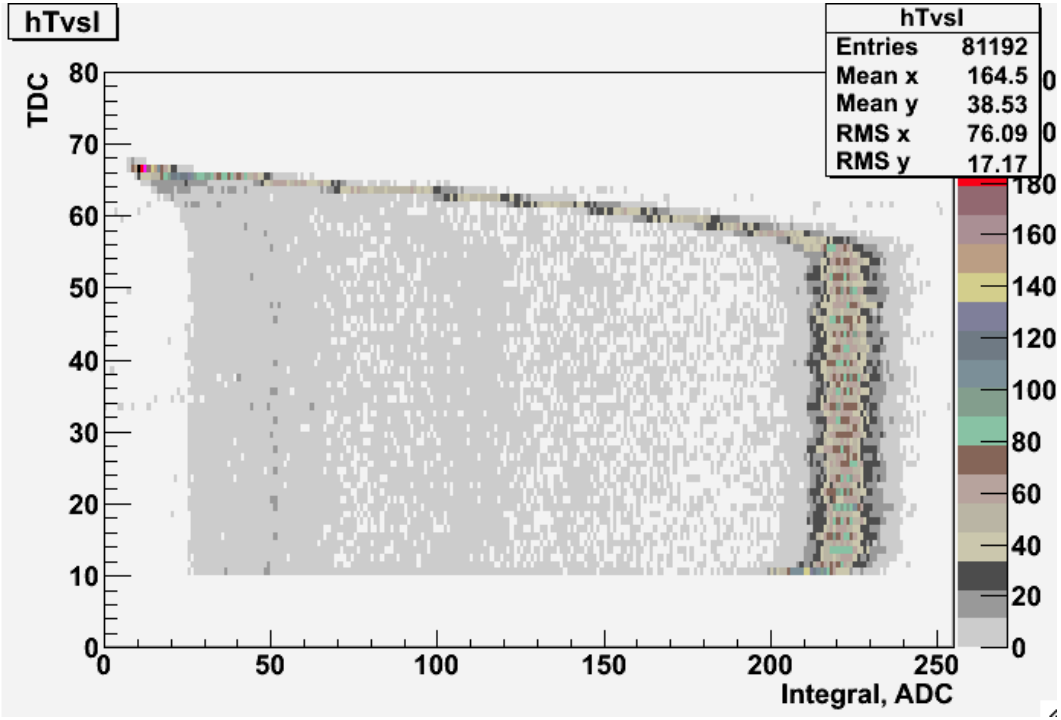
- Run 9: large amount of Int. over 30-40 nS
- Run 11: most of Int. in window 10-15 nS wide, rapid falloff

HUGE IMPROVEMENT

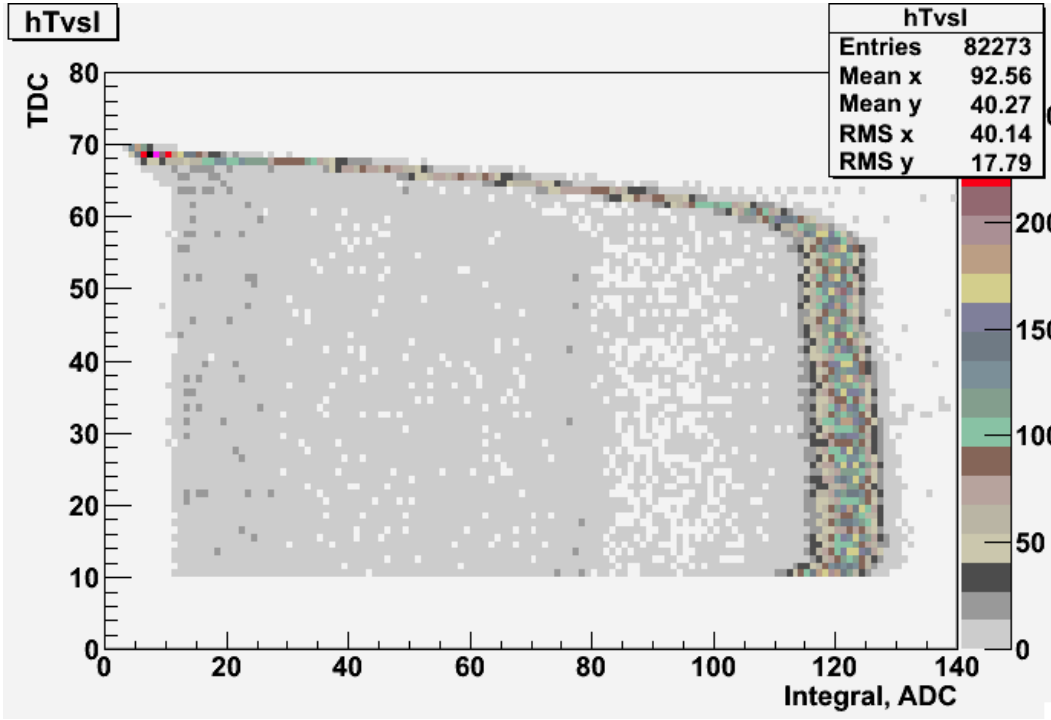
(D. Smirnov already showed Dec.)

Run 11 DAQ in ctg. house/tunnel

blu1 DAQ in ctg. house



blu2 DAQ in tunnel

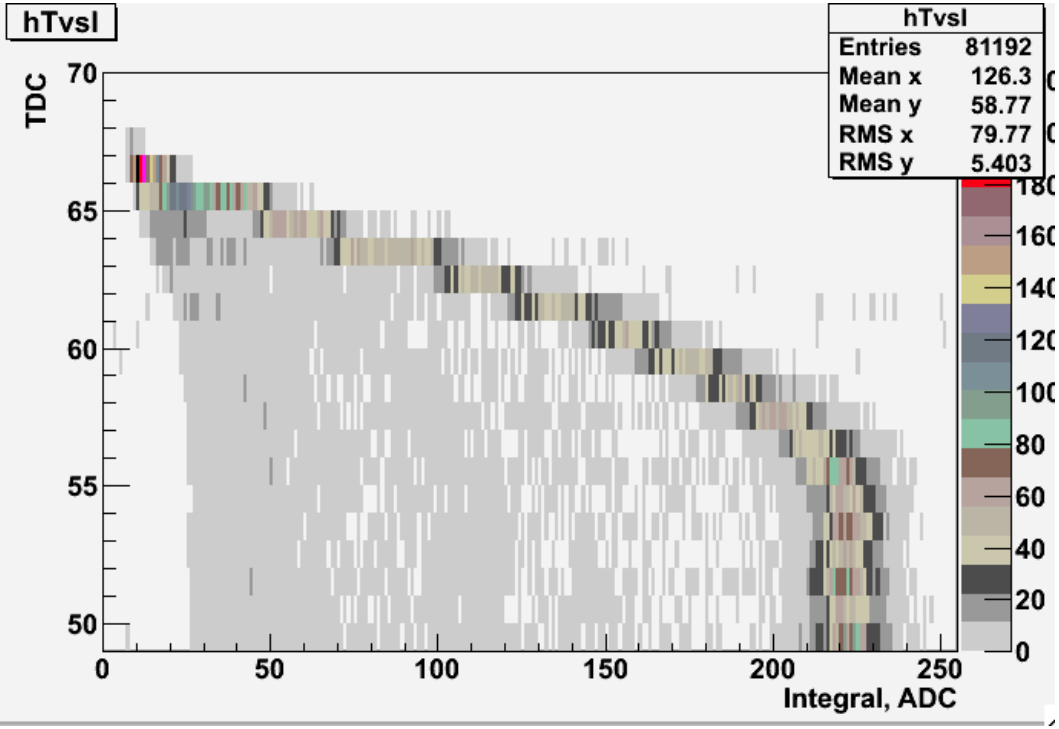


No obvious improvement w/ tunnel DAQ

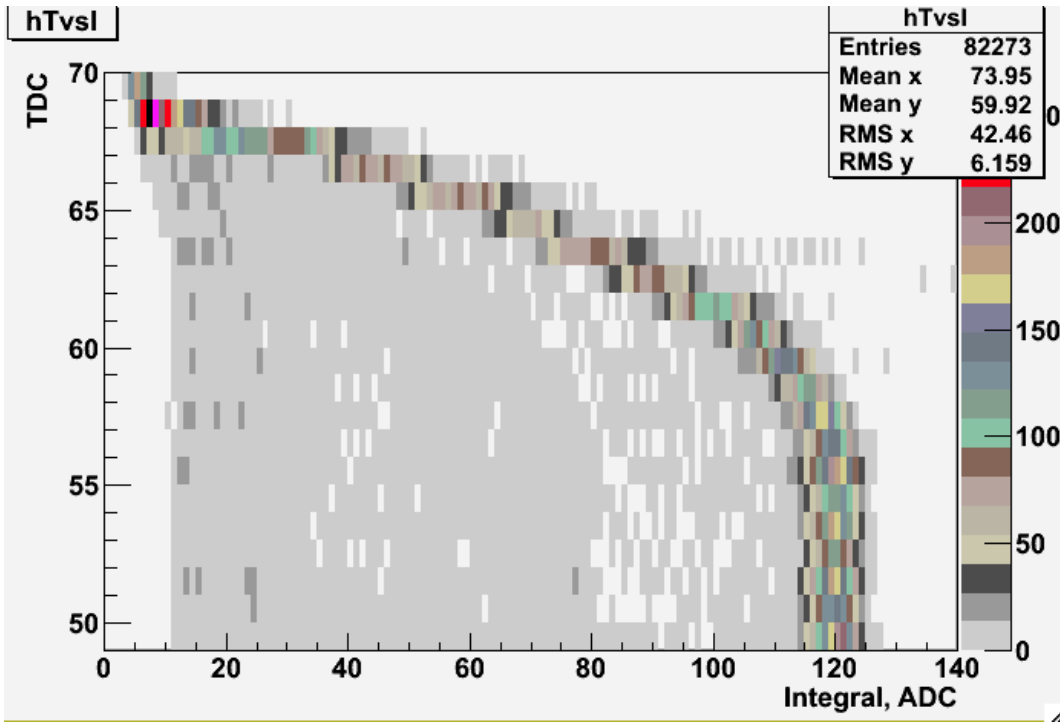
- Zoom in T for closer look:

Run 11 DAQ in ctg. house/tunnel

blu1 DAQ in ctg. house



blu2 DAQ in tunnel



- By my eye both fall off from full height to threshold in ~10 nS

NO DISCERNIBLE IMPROVEMENT FROM THIS MEASUREMENT

DAQ in tunnel: pros & cons

- No significant improvement in pulse width.
- What's left:

Advantages:

- Perhaps pulse is somehow 'nicer' in shape
- Need scope in tunnel to investigate...

Disadvantages:

- From shaper removal lost large factor in gain, dynamic range
- Problems with DAQ,

  WHICH HAVE NOT BEEN INFREQUENT (~2/WEEK),

  are not immediately accessible

- Is it worth considering withdrawing the DAQ from the tunnel back into the counting house?
- What the work would involve:

DAQ tunnel→counting house

- All of the DAQ is in two mini-racks, on wheels, fastened together:
  2 CAMAC crates, 2 NIM bins, PC, patch panels, power distribution...
- Numerous control signals between modules can be left in place,
  and the racks rolled out together
- Only 8 control signals come into the system from counting room:
  - blu/yel CLK, BZ, step motor H/V
  - can easily be removed and reconnected in counting room
- Exception: one NIM bin has T.P. fanout for all 4 polarimeters:
  - remove this bin/patch panel from mini-rack, leave in tunnel
  - only other modules in bin are discrim. to condition control signals,
    no longer needed with short cables in counting room

DAQ tunnel→counting house

The major tasks during access:

- Disconnect inputs to DAQ (72 signals),
- Remove T.P. bin/panel; this may be mechanically difficult
- Roll out to counting house
- At MUX output in tunnel (72 chan.): remove short signal cables to present DAQ, replace long signal cables to counting room

From Tony:
This may not be so easy, even in 8 hr. access.
Checking w/ Steve, Jim

Work not needing access:

- Roll DAQ into counting room, find a place
- reconnect inputs: control & signal
  need 72 short (few meter) LEMO? cables for signals
- Restore shapers onto mother boards:
  does this involve more than cutting jumper, install daughters?
- Another (subtle) question on BZ for Igor/Dima, will contact them
  (are BZ signals inverted at input to tunnel DAQ? Disc. output?)

Summary

- Advantages of DAQ in tunnel are so far not apparent
- So far two disadvantages are readily apparent:
  - loss of shaper gain/dynamic range
  - inaccessibility for repair/maintenance
- DAQ could straightforwardly be moved to counting room
  if all goes well ~1 shift

Note added:
Given Tony's concerns about time to move MUX cables, and other unforseens, maybe this Wed. too soon.
Use Wed. to inspect tunnel and plan more carefully?
And of course install some rad. mon.

EXTRAS